

WHAT IS CLAIMED IS:

1. A voltage-controlled oscillator for generating an oscillation signal with a frequency corresponding to first
5 and second control voltages, the voltage-controlled oscillator comprising:

a first current source for generating a first control current in accordance with the first control voltage, with the first current source varying a changing amount of the
10 first control current relative to a change in the first control voltage;

a second current source for generating a second control current in accordance with the second control voltage, with the second current source varying a changing amount of the
15 second control current relative to a change in the second control voltage;

a control voltage generation circuit connected to the first and second current sources to synthesize a synthesized current from the first and second control currents and
20 generate an oscillation control voltage in accordance with the synthesized current; and

a ring oscillator connected to the control voltage generation circuit to generate the oscillation signal with a frequency corresponding to the oscillation control voltage.
25

2. The voltage-controlled oscillator according to claim 1, wherein the first current source includes:

a first input current circuit for generating current in accordance with the first control voltage;

30 a plurality of first output current channels current mirror-connected and parallel-connected to the first input current circuit; and

a plurality of first switches, each being series-

connected to an associated one of the first output current channels, with the first current source varying the changing amount of the first control current relative to a change in the first control voltage by selectively opening and closing
5 the plurality of first switches; and

the second current source includes:

a second input current circuit for generating current in accordance with the second control voltage;

a plurality of second output current channels current
10 mirror-connected and parallel-connected to the second input current circuit; and

a plurality of second switches, each being series-connected to an associated one of the second output current channels, with the second current source varying the
15 changing amount of the second control current relative to a change in the second control voltage by selectively opening and closing the plurality of second switches.

3. The voltage-controlled oscillator according to
20 claim 2, further comprising:

a control circuit connected to the first and second current sources to selectively open and close the plurality of first and second switches.

25 4. A voltage-controlled oscillator for generating an oscillation signal with a frequency corresponding to a plurality of control voltages, the voltage-controlled oscillator comprising:

a plurality of current sources, each generating a
30 control current in accordance with an associated one of the control voltages, each current source varying a changing amount of its respective control current relative to a change in the associated control voltage;

a control voltage generation circuit connected to the plurality of current sources to synthesize a synthesized current from the control currents and generate an oscillation control voltage in accordance with the
5 synthesized current; and

a ring oscillator connected to the control voltage generation circuit to generate the oscillation signal with a frequency corresponding to the oscillation control voltage.

10 5. The voltage-controlled oscillator according to claim 4, wherein each current source includes:

an input current circuit for generating current in accordance with the associated control voltage;

a plurality of output current channels current mirror-
15 connected and parallel-connected to the input current circuit; and

a plurality of switches, each being series-connected to an associated one of the output current channels;

each current source varying a changing amount of the
20 control current relative to a change in the associated control voltage by selectively opening and closing the plurality of switches.

25 6. The voltage-controlled oscillator according to claim 5, further comprising:

a control circuit connected to the current sources to selectively open and close the plurality of switches of each current source.

30 7. A method for controlling a voltage-controlled oscillator that generates an oscillation signal with a frequency corresponding to first and second control voltages, the method comprising:

generating a first control current in accordance with
the first control voltage by supplying the voltage-
controlled oscillator with the first control voltage;
varying a changing amount of the first control current
5 relative to a change in the first control voltage;
generating a second control current in accordance with
the second control voltage by supplying the voltage-
controlled oscillator with the second control voltage;
varying a changing amount of the second control current
10 relative to a change in the second control voltage;
synthesizing a synthesized current from the first and
second control currents to generate an oscillation control
voltage in accordance with the synthesized current; and
generating the oscillation signal with a frequency
15 corresponding to the oscillation control voltage.

8. The method according to claim 7, wherein:
the voltage-controlled oscillator includes a first
current source having a plurality of first output current
20 channels and a second current source having a plurality of
second output current channels;
said varying a changing amount of the first control
current includes selectively connecting in parallel the
first output current channels; and
25 said varying a changing amount of the second control
current includes selectively connecting in parallel the
second output current channels.